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A new species of the natricine snake genus *Amphiesma* from the Indochinese Region (Squamata: Colubridae: Natricinae)

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Abstract

A new species of the natricine snake genus *Amphiesma* is described from Central Vietnam and possibly Thailand. *Amphiesma leucomystax* **spec. nov.** is distinguished from other species of the Indochinese Region by the combination of a bright, broad white stripe extending below the eye from the tip of the snout to posterior supralabials and the neck, dorsolateral series of aligned, transversally elongated or divided spots, 19 dorsal scale rows at midbody, two first rows of dorsal scale rows smooth, moderately sized eyes, a high number of ventral scales (at least 154), and 1 anterior temporal. Its relationships with other *Amphiesma* species with 19 dorsal scale rows are discussed. *Amphiesma leucomystax* **spec. nov.** seems to be close to *A. boulengeri*. A key to the species of *Amphiesma* from the Indochinese Region is provided.

Key words: Vietnam, Indochinese Region, Serpentes, Natricinae, *Amphiesma*, *Amphiesma leucomystax* **spec. nov.**, morphology, taxonomy, natural history

Introduction

As part of a recent description of a new species (*Amphiesma andreae*) of the natricine genus *Amphiesma* Duméril, Bibron & Duméril, 1854, Ziegler & Le (2006) summarized the composition and the taxonomic controversies of this genus in Vietnam. Currently, ten species of *Amphiesma* (natricine species with lateral or dorsolateral nostrils, subequal small teeth followed by two moderately enlarged posterior teeth and large eyes with a round pupil) are known from the country: *Amphiesma andreae* Ziegler & Le, 2006; *Amphiesma atemporale* (Bourret, 1934), *Amphiesma bitaeniatum* (Wall, 1925), *Amphiesma boulengeri* (Gressitt, 1937), *Amphiesma craspedogaster* (Boulenger, 1899), *Amphiesma deschauenseei* (Taylor, 1934; a valid species, distinct from *Amphiesma modestum* Günther, 1875 according to Taylor [1965]), *Amphiesma optatum* (Hu & Zhao, 1966), *Amphiesma popei* (Schmidt, 1925), *Amphiesma sauteri* (Boulenger, 1909), and *Amphiesma stolatum* (Linnaeus, 1758) (Nguyen *et al.*, 2005; Ziegler & Le, 2006; David *et al.*, in prep.). Furthermore,

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Amphiesmoides ornaticeps (Werner, 1924) is present in southern China, whereas northern Laos and northern Thailand are also inhabited by *Amphiesma khasiense* (Boulenger, 1890). However, some species of *Amphiesma* are so poorly diagnosed and quite variable (see, for example, the "wide" variation given by Smith (1943) to *Amphiesma modestum*) that identification of populations may be difficult. Furthermore, the affinities of *Amphiesma* species are still unclear owing to the lack of phylogenetic analyses.

Ziegler (2002: 219–220) depicted specimens of an unidentified, conspicuous species of *Amphiesma* discovered in a protected lowland forest area lying in the south of Ha Tinh Province, Vietnam. Although showing a distinct pattern on the head, this species was not named. Recent collections by other workers have included additional specimens of this undescribed species from several other provinces in Vietnam (e.g., Ziegler *et al.*, 2004), as well as a specimen reported as originating from Thailand. This species is here described, and compared with other species of the genus of the Indochinese Region.

Material and methods

The description is established from external morphological characters regarded as taxonomically significant in the genus *Amphiesma* as defined by Malnate (1960, 1962), Malnate & Underwood (1988), David & Das (2003) and Ziegler & Le (2006). Maxillary teeth were counted by dissecting the right maxilla of one specimen and, for other specimens, in removing the exterior gum surfaces of the jaw *in situ*. Dentitional data of other species were obtained in the same way (tooth sockets were included in the counts in cases of tooth loss). The new species was compared with 243 specimens of 16 *Amphiesma* species inhabiting China, and the Indo-Himalayan and Indo-Chinese Region (Appendix I). Comparison with other species was based on the literature and especially on data provided in Ziegler & Le (2006).

Measurements, except body and tail lengths, were taken with a slide-calliper to the nearest 0.1 mm; all measures on body were measured to the nearest millimetre. The number of ventral scales is counted according to Dowling (1951). The numbers of dorsal scale rows are given at one head length behind head, at midbody (i.e. at the level of the ventral plate corresponding to half of the total ventral number), and at one head length before vent respectively. The terminal scute is not included in the number of subcaudals. Values for symmetric head characters are given in left/right order.

Abbreviations of measures and other meristic characters used in the text are:

Measures and ratios: HL: head length. - SVL: snout-vent length. - TaL: tail length. - TL: total length. - TaL/TL: ratio tail length/total length.

Meristic characters: ATe: anterior temporals. - DSR: formula of dorsal scale rows. - MSR: number of dorsal scale rows at midbody. - PosOc: postoculars. - PreOc: preoculars. - IL: infralabials. - SC: subcaudals. - SL: supralabials. - SupOc: supraoculars. - VEN: ventrals.

Museum abbreviations: AMNH: American Museum of Natural History, New York, USA.—BBB: Bharat B. Bhatt's private collection, State Research Institute, Itanagar, Arunachal Pradesh, India.—BMNH: The Natural History Museum, London, UK.—CAS: California Academy of Sciences, San Francisco, USA.—CIB: Chengdu Institute of Biology, Chengdu, People's Republic of China.—CUB MZ: Chulalongkorn University (Bangkok) Museum of Zoology, Bangkok, Thailand.—FMNH: Field Museum of Natural History, Chicago, USA.—IEBR: Institute of Ecology and Biological Resources, Vietnamese Academy of Science and Technology, Hanoi, Vietnam.—KSC: Kohima Science College, Kohima, Nagaland, India.—LSUHC: La Sierra University, Riverside, California, USA.—MNHN: Muséum National d'Histoire Naturelle, Paris, France.—MVZ: Museum of Vertebrate Zoology, Berkeley, USA.—NRCT: National Research Council of Thailand, Bangkok, Thailand.—PNKB: collection of the Science Research Centre, Phong Nha-Ke Bang National Park, Vietnam.—PSUaa: Penn State Altoona College, Altoona, USA.—QSMI: Queen Saovabha Memorial Institute, Thai Red Cross Society, Bangkok, Thailand.—ROM: Royal Ontario Museum, Toronto, Canada.—SMNH:

Shanghai Museum of Natural History, Shanghai, People's Republic of China.—USNM: United States National Museum, Washington, USA.—VNUH: Vietnam National University, Hanoi, Vietnam.—ZFMK: Zoologisches Forschungsmuseum Alexander Koenig, Bonn, Germany.—ZISP: Zoological Institute, Russian Academy of Sciences, St. Petersburg, Russia.—ZMB: Zoologisches Museum für Naturkunde der Humbolt-Universität zu Berlin, Berlin, Germany.—ZRC: Zoological Reference Collection, Raffles Museum of Biodiversity Research, National University of Singapore, Singapore.—ZSI/ERS: Eastern Regional Station of the Zoological Survey of India, Shillong, Meghalaya, India.

Results

The dentition of the maxilla (composed of subequal small teeth followed by two slightly enlarged posterior teeth), round pupil, lateral nostrils, keeled dorsal scale rows and the general pattern are typical of the genus *Amphiesma* as defined by Malnate (1960). This genus can be distinguished from the genus *Rhabdophis* by the presence of a simple sulcus spermaticus (forked in *Rhabdophis*) and relatively small posterior teeth (abruptly and strongly enlarged in *Rhabdophis*). It differs from *Sinonatrix* Rossman & Eberle, 1977 by the presence of internasal scales that are broad anteriorly, and laterally-positioned nostrils (internasals narrowed anteriorly, dorsolaterally-positioned nostrils in *Sinonatrix*). Although our specimens show most typical characters of the genus *Amphiesma*, they do not fit any species known from Vietnam, or with any other species of *Amphiesma*. We regard these specimens as representing a new species, which we describe herein.

***Amphiesma leucomystax* spec. nov.**
(Figs. 1–11)

Holotype. – ZFMK 71702, an adult female, from the southeastern border of the Ky Anh - Ke Go lowland forest protected area, surroundings 18°00'N-106°06'E, Cam Xuyen District, Ha Tinh Province, Vietnam, 125 m asl. Coll. by Thomas Ziegler, 12 July1997.

Paratypes (22 specimens). – VIETNAM. Nghe An Province. ZISP 23665 (female), Khe Kam River, Bu Cam (summit of mountain), 19°37'99"N–105°14'93"E, Chau Nga Village, Ban Man Town, Quy Chau District, 1000 m. Coll. by Nikolai L. Orlov, Sergei A. Ryabov and Ho Thu Cuc, 29 March 2003.—Ha Tinh Province. ZFMK 71703 (female), lowland forest bordering Lake Ke-Go, surroundings 17°59'N–106°03'E, Cam Xuyen District, 170 m asl. Coll. by Thomas Ziegler, 26 September 1998. - ZFMK 71704 (female), southeastern border of Ky Anh - Ke Go Tropical forest protected area, Cam Xuyen District, 270 m asl. Coll. by Thomas Ziegler, 29 August 1997. - ZISP 23664 (female), Rao An river, 18°20'62"N-105°14'24"E, Son Kim Village, Huong Son District, 300 m. Coll by Nikolai L. Orlov, 24 April 2000.—Quang Binh Province. MNHN 2006.0447 (female), karst forest of Phong Nha - Ke Bang National Park, Bo Trach and Minh Hoa Districts. Coll. by Thomas Ziegler & A. Heidrich, 20 June 2006. - VNUH 16.6.'05-1 (female), karst forest of Phong Nha - Ke Bang National Park, Bo Trach and Minh Hoa Districts. Coll. by Thomas Ziegler & Vu Ngoc Thanh, 16 June 2005. - ZFMK 80660 (female), karst forest of Phong Nha - Ke Bang National Park, Bo Trach and Minh Hoa Districts. Coll. by Thomas Ziegler, 2 September 2003. - ZISP 23666 (female), Phong Nha-Ke Bang National Park, 350 m, Bo Trach and Minh Hoa Districts. Coll. by Nikolai L. Orlov, Sergei A. Ryabov and Ho Thu Cuc, 10 July 2003.—Quang Tri Province. ZISP 23669, ZISP 23671, ZISP 23674–23675 (males), ZISP 23668, ZISP 23670, ZISP 23672-23673 (females), Ban Cup, 16°55'N–106°35'E, Huong Lap Village, Huong Hoa District, 350–480 m. Coll. by Nikolai L. Orlov, Nguyen Quang Truong and Ho Thu Cuc, 20 April–13 May 2005.—Thua Thien Hue Province. AMNH 154175 (female), from Khe Huong, a tributary to Khe Dau (Dau River), 16°18'24"N–107°32'38"E, Binh Thanh Commune, Huong Thuy District, 109 m asl. Coll. by

Nguyen Quang Truong, Raoul H. Bain, C. K. Dang, and T. D. Nguyen, 8 September 2005. - IEBR 2314 (female), from A Bong Stream, Huong Nguyen Commune, near 16°14' 26"N–107°27'11"E, A Luoi District, ca. 152 m. Coll. by Raoul H. Bain, Nguyen Quang Truong and V. M. Tran, 19 August 2005. - ZISP 23667 (male), Bach Ma Bang National Park, 500 m, Phu Loc District. Coll. by Nikolai L. Orlov and Ho Thu Cuc, 15 October 2003.—Gia Lai Province. FMNH 252118-252119 (females), from An Khe District (= Ke Bang). Coll. by Ilya S. Darevsky and Nikolai L Orlov, 25 March 1995 and 11 April 1995 respectively. - ZISP 23663 (male), Buon Luoi village, 14°20'N–108°36E', Kannack Town, Ang Khe District, 750 m. Coll. by Nikolai L. Orlov, 4 April 1995.

Additional material (2 specimens).—VIETNAM. PNKB RH06213 (adult male), Phong Nha - Ke Bang National Park, Bo Trach and Minh Hoa Districts, Quang Binh Province, Vietnam. Coll. by Ralf Hendrix and Dang Ngoc Kien, 26 August 2006.—**THAILAND**. PSUaa 0054 (male), from "Thailand". This specimen was previously deposited in the former Thai National Collection, in which many specimens were only labeled as "Thailand". However, the origin of this specimen remains questionable.

Etymology.—The specific nomen derives from the Greek adjective *λευκο*, *leucos*, meaning white, and the Greek noun *μύσταξ*, *mystax*, meaning either a moustache or an upper lip, a reference to the broad white stripe extending on the upper lips of this species.

We suggest the following common names: White-lipped Keelback (English), Amphiesme à lêvres blanches (French), Weißlippen-Gebirgswassernatter (German) and Ran sai mep trang (Vietnamese).

Diagnosis.—A species of the genus *Amphiesma*, characterized by a combination of the following characters: (1) a broad, continuous, white stripe extending under the eye from the tip of the snout across the upper half of supralabials and the nape to produce a V-like chevron; (2) vertically elongated or divided dorsolateral spots, salmon or rusty red (cream in preservative) on a dark grey background; (3) tips of ventrals black, with additional faint and ill defined dark blotches on inner side; (4) 19-19-17 DSR, distinctly keeled on rows 3–10 or 4–10, smooth on rows 1–2 or 1–3; scales of 1st DSR enlarged; (5) 154–166 ventral plates; (6) internasals narrowed anteriorly; (7) 1 anterior temporal, 1 preocular and usually 3 postoculars; (8) a moderately sized eye (see below).

Description of the holotype (Figs. 1–7).—Body moderately stout; head average (4.8% of SVL), distinct from the neck, flat anterior to eye; snout long, 28.5% of HL, 2.2 times as long as horizontal diameter of the eye, blunt from above, subrectangular in profile; nostril lateral, crescentic, piercing in middle of divided nasal in its lower half; eye moderately sized, diameter 1.3 times greater than distance between its inferior margin and edge of upper lip; pupil round; tail cylindrical and tapering.

Size. - SVL: 406 mm; TaL: 189 mm; TL: 595 mm; HL: 19.4 mm; ratio TaL/TL: 0.318.

Dentition. - Maxillary teeth: 26 gradually enlarged + 2 distinctly enlarged teeth posteriorly, without diastema.

Body scalation. - DSR: 19-19-17. Scales not notched at their posterior extremities.

Dorsal scale row reduction:

$$19\ \frac{\begin{array}{l}4{+}5 \rightarrow 4\ \ (95)\ \text{(left)}\\ 4{+}5 \rightarrow 4\ \ (101)\ \text{(right)}\end{array}}{}\ 17$$

Scales of rows 3–10 distinctly keeled with narrow, sharp keel, more keeled on posterior half of body; scales of rows 1–2 smooth.

158 VEN (+ 2 preventrals); 100 SC, all paired. Anal divided.

Length of tail with 6 scale rows, in number of subcaudals spanned (see Malnate & Underwood, 1988): 32; length of tail with 4 scale rows: 33. Ratio Length 4 rows / Length 6 rows: 1.03.

Head scalation. - Rostral hexagonal, wider than high; nasals subrectangular, longer than high, divided

below the nostril, with crescentic, laterally opening nostril in its middle; internasals distinctly subtriangular and narrow anteriorly, 1.4 times as long as wide and about 0.5 times as wide anteriorly than posteriorly; prefrontals subrectangular, broader than long, reaching loreal; frontal hexagonal, small, 1.55 times as long as wide, with apex directed posteriorly, 2.3 times longer than suture between prefrontals; parietals long and wide, in contact for a length 1.0 times as great as the frontal length; loreal 1/1, small, rectangular, elongate horizontally, 0.7 time as high as long, in broad contact with nasal; preoculars 1/1; postoculars 3/3, much larger than the two lower ones; supralabials 10/10, SL 1–2 at left, 1–3 at right in contact with nasal, 3–4 at left, 2–4 at right in contact with loreal, 5–7 entering orbit on both sides, 8th and 9th largest; temporals: 1+1 on both sides; infralabials 10/10, first pair in contact behind the mental, four anteriors in contact with anterior chin shields; posterior chin shields shorter than anterior ones, followed by one pair of gulars.

FIGURE 1. Preserved holotype of *Amphiesma leucomystax* **spec. nov.** (ZFMK 71702, adult female). General view. Photograph by P. David.

Coloration in alcohol.—Body dark ashy brownish-grey, darker above than on sides, resulting from dense, intricate speckling of dark grey minute dots on paler greyish-brown background; many scales edged with black, giving variegations or a loose network on upper surface of body and sides; sides with irregular faint black blotches, alternate in two rows, giving an indistinct quincuncially arranged pattern; dorsolateral stripe from side of neck to the vent, faint beige, more visible in the posterior half of the body, marked with a series of spots on DSR 6–7, conspicuous, light brown or beige, transversally elongated or divided into two parts, better defined anteriorly than posteriorly, about 70 in total, some edged with dark brown; tail as body, dorsolateral series of horizontally elongated beige spots, progressively vanishing on the tip of the tail.

Head and parietal region dark brown, with irregular paler vermiculations and some scattered beige dots; a short cream sagittal line just behind parietal suture; rostral cream, dotted with minute grey spots; broad, continuous, pure white stripe extends from tip of snout, across supralabials to the corner of the mouth, curving

dorsally on neck to vertebral scale, nearly connecting to stripe of other side, producing a very conspicuous V-like chevron on nape; this stripe is continuous on whole of the upper half of SL 1 to 6, largely dotted with minute brown or grey spots and with an irregular lower edge in the region of SL 1–4, expands on the lowest parts of loreal and preocular, then directly borders the orbit; on SL 7–10, the stripe extends on a width equal to nearly one half of the scale, expands on lower part of the lower preocular at level of SL 7, leaving only a narrow upper margin of brown on SL 8, found on upper parts of SL 9 and in center of SL 10, becomes progressively more narrow as it curves dorsally.

FIGURE 2. Preserved holotype of *Amphiesma leucomystax* **spec. nov.** (ZFMK 71702, adult female). Close-up view of the dorsal pattern. Photograph by P. David.

Venter cream, with tip of each ventral greyish-brown and another small, faint greyish-brown blotch on the inner side; infralabials heavily spotted with greyish-brown near edge of the lip.

Coloration in life. - Rather similar to that in alcohol, with the exception of dorsolateral spots, which are rusty red, and the apex of the chevron on the neck, which is bright yellow (see Figs. 6–7).

Description of paratypes (Figs. 8–9). – A summary of morphological and meristic data of the 22 paratypes is given in Table 1. Other important characters that vary with the holotype are discussed below in the description of the species (see "Variation").

Variation.—The largest total length known is 772 mm for a male (SVL 527 mm, TaL 245 mm; ZISP 23671). The largest known female is 517 mm long (SVL 517 mm, TaL 228 mm; ZFMK 80660). The shortest specimen in our sample is only 238 mm long (SVL 163 mm, TaL 75 mm; ZISP 23667).

Dentition (Fig. 10): 28–30 maxillary teeth in a continuous series, gradually enlarged, posterior two slightly more enlarged.

Body relatively slim in males, more stout in females; head elongated, distinct from the neck, accounting (in adults above SVL 300 mm) for 4.0–5.2 % of SVL (x = 5.0 %); snout long, in adults 23.9–34.4 % (x = 29.7 %) of HL in both sexes, or 1.9–2.2 (x = 2.0) times as long as diameter of eye, without sexual size dimorphism; eye 1.4–1.6 (x = 1.5) times the distance eye–lip in both sexes. Tail tapering progressively. Ratio TaL/TL: 0.279–0.327, weakly sexually dimorphic (see below).

TABLE 1. Morphological characters of the paratypes of *Amphiesma leucomystax* **spec. nov.**

Collection number	Sex	Teeth	SVL (mm)	TaL (mm)	TaL/ TL	VEN	SC	SL	PostOc	IL
ZISP 23663	M	27+2	462	207	0.310	159	107	9/9	3/3	10/10
ZISP 23664	M	26+2	308	-	-	161	-	9/9	3/3	10/10
ZISP 23667	M	-	163	75	0.315	163	105	9/9	3/3	10/10
ZISP 23671	M	26+2	527	245	0.317	165	109	9/9	3/3	10/10
ZISP 23674	M	26+2	428	213	0.332	159	101	9/9	3/3	10/10
ZISP 23675	M	26+2	492	-	-	160	-	9/9	3/3	10/10
FMNH 252118	F	26+2	422	202	0.324	154	98	9/9	3/3	10/10
FMNH 252119	F	?	209	81	0.279	154	-	9/9	3/3	10/10
ZFMK 71703	F	26+2	433	194	0.309	159	97	9/9	3/3	10/10
ZFMK 71704	F	27+2	393	176	0.309	157	95	9/10	3/3	10/10
ZFMK 80660	F	26+2	517	228	0.306	156	95	9/9	3/3	10/10
VNUH 16.6.05-1	F	27+2	374	182	0.327	159	103	9/9	3/3	10/10
MNHN S 0127	F	28+2	516	-	-	159	-	9/9	3/3	10/10
IEBR 2314	F	?	492	221	0.310	155	94	9/9	3/3	10/10
AMNH 154175	F	26+2	391	-	-	156	-	9/9	3/3	10/10
ZISP 23665	F	26+2	458	193	0.296	158	100	9/9	3/3	10/10
ZISP 23666	F	28+2	251	108	0.300	159	102	9/9	3/3	10/10
ZISP 23668	F	-	205	91	0.307	159	98	9/9	3/3	10/10
ZISP 23669	F	27+2	306	140	0.313	157	95	9/9	3/3	10/10
ZISP 23670	F	26+2	505	-	-	154	-	9/9	3/3	10/10
ZISP 23672	F	26+2	496	217	0.304	158	99	9/9	3/3	10/10
ZISP 23673	F	28+2	438	207	0.320	156	98	9/9	3/3	10/10

FIGURE 3. Preserved holotype of *Amphiesma leucomystax* **spec. nov.** (ZFMK 71702, adult female). Left side of head. Photograph by P. David.

DSR: 19–19–17, more or less strongly keeled on rows 3–10 in both sexes, always smooth on 1st and 2nd DSR.

The reduction (DSR 4+5 → 4) appears at VEN 92–99 (x = 94.7, s = 2.1) at left, at VEN 96–102 (x = 99.2, s = 2.3) at right.

VEN: 154–166 (plus 1–2 preventrals); SC: 94–109, all paired; anal shield divided.

In females, length (in number of subcaudals spanned) of 6 caudal scale rows (see Malnate & Underwood, 1988): 34–44; length of 4 caudal scale rows: 27–36. Ratio length 4 caudal rows / length 6 caudal rows: 0.75–1.03 (x = 0.82; s = 0.11).

FIGURE 4. Preserved holotype of *Amphiesma leucomystax* **spec. nov.** (ZFMK 71702, adult female). Dorsal view of head. Photograph by P. David.

FIGURE 5. Preserved holotype of *Amphiesma leucomystax* **spec. nov.** (ZFMK 71702, adult female). Ventral view. Photograph by P. David.

The head scalation is as described for the holotype and paratypes, with the following variation: internasals 1.2–1.4 times as long as wide, 0.45–0.55 times as wide anteriorly than posteriorly; prefrontals subrectangular, broader than long; frontal hexagonal, 1.4–1.6 times as long as wide, with apex directed posteriorly, 1.1–1.2

times longer than the prefrontals; parietals in contact for a length 1.1–1.2 times as great as the frontal length; 1 subrectangular loreal, 0.65–0.75 times as high as long, in broad contact with the nasal; 1/1 preoculars; usually 3 postoculars (2 in 1 / 50 occurrences), the upper much larger than the two lowers; 9 (47 / 50 occurrences) or 10 (3 / 50 occurrences) supralabials, SL 1–2 (rarely 1—3) in contact with the nasal, SL 2–3 (9 / 46 occurrences), 2–4 (7 / 46) or 3–4 (5 / 20) in contact with loreal, SL 4–5–6 (33 / 48 occurrences), 4–5 (1 / 48), 5–6–7 (3 / 48) or 5–6 (1 / 48) entering orbit; SL 6–7 or 6–7–8 largest; 1+1 temporals in all specimens; 10 infralabials in all specimens, first pair in contact behind the mental, the four first are in contact with the anterior chin shields; posterior chin shields shorter than anterior shields.

FIGURE 6. Holotype in life of *Amphiesma leucomystax* **spec. nov.** (ZFMK 71702, adult female). General view. Photograph by T. Ziegler.

Coloration in alcohol largely as described for holotype; body usually more grey (as dark ashy grey) than brown, darker above than on sides; variegations or a loose network on upper surface of body and sides more or less visible; dorsolateral stripe usually faint or absent, more visible in posterior half of body, always marked with a series of 70–75 light brown or beige (in alcohol; orange or rusty red in life) spots on DSR 6–7, transversally elongated or divided into two parts, better defined anteriorly than posteriorly. The tail is patterned as the body, with dorsolateral series of horizontally elongated beige spots.

Head dorsal surface and parietal region dark brown as in holotype, with irregular paler vermiculations and scattered beige dots; sagittal line behind parietals more or less visible; a broad, continuous, white stripe from snout tip to corner of the mouth, continuing to neck, present and conspicuous in all specimens; on nape, V-like chevron is present in all animals; stripe extends on whole of upper half of SL 1 to 6, bordering orbit and reaching lower part of lower preocular; in specimens with 9 SL, white stripe broadly crosses upper part of SL 7, leaving only a narrow upper margin of brown on this latter scale, then center of SL 8 and 9; on these latter scales, stripe occupies at least half of the scale.

Venter cream or pale yellow; tip of each ventral greyish-brown; a medial small, more or less faint greyish-

brown blotch, never well defined (as in *Amphiesma boulengeri*, for example). Infralabials heavily spotted with greyish-brown near the edge of the lip.

FIGURE 7. Holotype in life of *Amphiesma leucomystax* **spec. nov.** (ZFMK 71702, adult female). Close-up view of the head. Photograph by T. Ziegler.

In life, coloration and pattern are very similar to conditions in preservative; most notable differences are color of dorsolateral spots (salmon or rusty red in life), and posterior extremity of lateral streak of head (becoming yellow on the nape; see Figs. 6-9); dorsolateral spots are each connected by a narrow, weak reddish-brown band; upper dorsal surface dark grey, dark to bluish-grey or dark brownish-grey, with dark spots and irregular bars; dorsolateral spots extend to tail; upper head surface rather dark, reddish-brown in its middle with few small light spots; a weak light longitudinal line extends medially on hind part of head; in all specimens, lateral head streak white or cream and stretches from snout tip along the upper supralabials to neck, where both stripes nearly meet each other in a V-like chevron; tongue light behind, then darker, tips - including bifurcation point - light again; venter cream, pale yellowish-grey or very light grey, with a more or less conspicuous dark spot on tips of ventrals.

Sexual dimorphism.—It is best defined in the numbers of ventrals of subcaudals:

(1) Differences in the number of ventrals:

159–166 (x = 161.9, s = 2.9) in males vs. 154–159 (x = 156.9, s = 1.9) in females.

(2) Differences in the number of subcaudals:

101–109 (x = 104.6, s = 3.6) in males vs. 95–103 (x = 97.9.9, s = 2.8) in females.

There is no clear difference in the ratio TaL/TL (males: 0.309–0.332 [x = 0.319, s = 0.010]; females: 0.279–0.0326 [x = 0.309, s = 0.012].

Hemipenes (Fig. 11).—From specimen PNKB RH06213 (both hemipenes are only partly everted, with only the base visible while the lobular region is still inverted): hemipenes short, massive. The everted part is uniformly covered with small to medium sized spines; a pair of larger spines visible close to the sulcus on the proximal half of the hemipenial body.

FIGURE 8. Paratype in life of *Amphiesma leucomystax* **spec. nov.** (ZFMK 71704, adult female). Photograph by T. Ziegler.

FIGURE 9. Paratype in life of *Amphiesma leucomystax* **spec. nov.** (MNHN 2006.0447, adult female). Photograph by T. Ziegler.

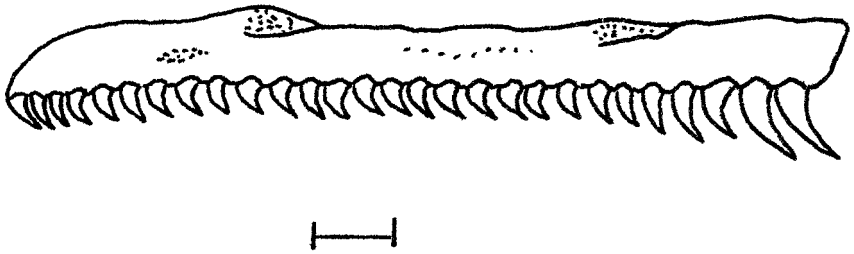

FIGURE 10. Left maxilla of *Amphiesma leucomystax* **spec. nov.** (MNHN 2006.0447, adult female). Scale bar = 1 mm.

FIGURE 11. Partly everted hemipenes of *Amphiesma leucomystax* **spec. nov.** (PNKB RH06213). Photograph by R. Hendrix.

Distribution (Fig. 12).—**Vietnam**. *Amphiesma leucomystax* **spec. nov.** is currently known from several localities in the provinces (from North to South) of Nghe An (Quy Chau District), Ha Tinh (Cam Xuyen and Huong Son Districts), Quang Binh (Bo Trach and Minh Hoa Districts), Quang Tri (A Luoi, Phu Loc and Huong Hoa Districts), Thua Thien-Hue (Huong Thuy and A Luoi Districts), Quang Nam (Ba Na National Park, Hoa Vang District), Kon Tum (Ngoc Linh Mt., on the border between Quang Nam and Kon Tum Provinces), and Gia Lai (An Khe District).—**Thailand (?)**. The Thai specimen has no exact locality, based on a single specimen (see above) of unconfirmed origin.

Based on the Vietnamese distribution, this species may be expected in eastern Laos, especially in the western slopes of the Annamite Range.

Biology.—This species inhabits lowland and montane monsoon evergreen tropical forests of the Annamite Range (or Truong Son) and Tay-Nguyen Plateau (Central Vietnam) between about 100 and 1300 m, although most specimens were obtained above 350 asl. Specimens for which data are available were collected in primary or disturbed forests; one was obtained in the clearing of a disturbed lowland forest.

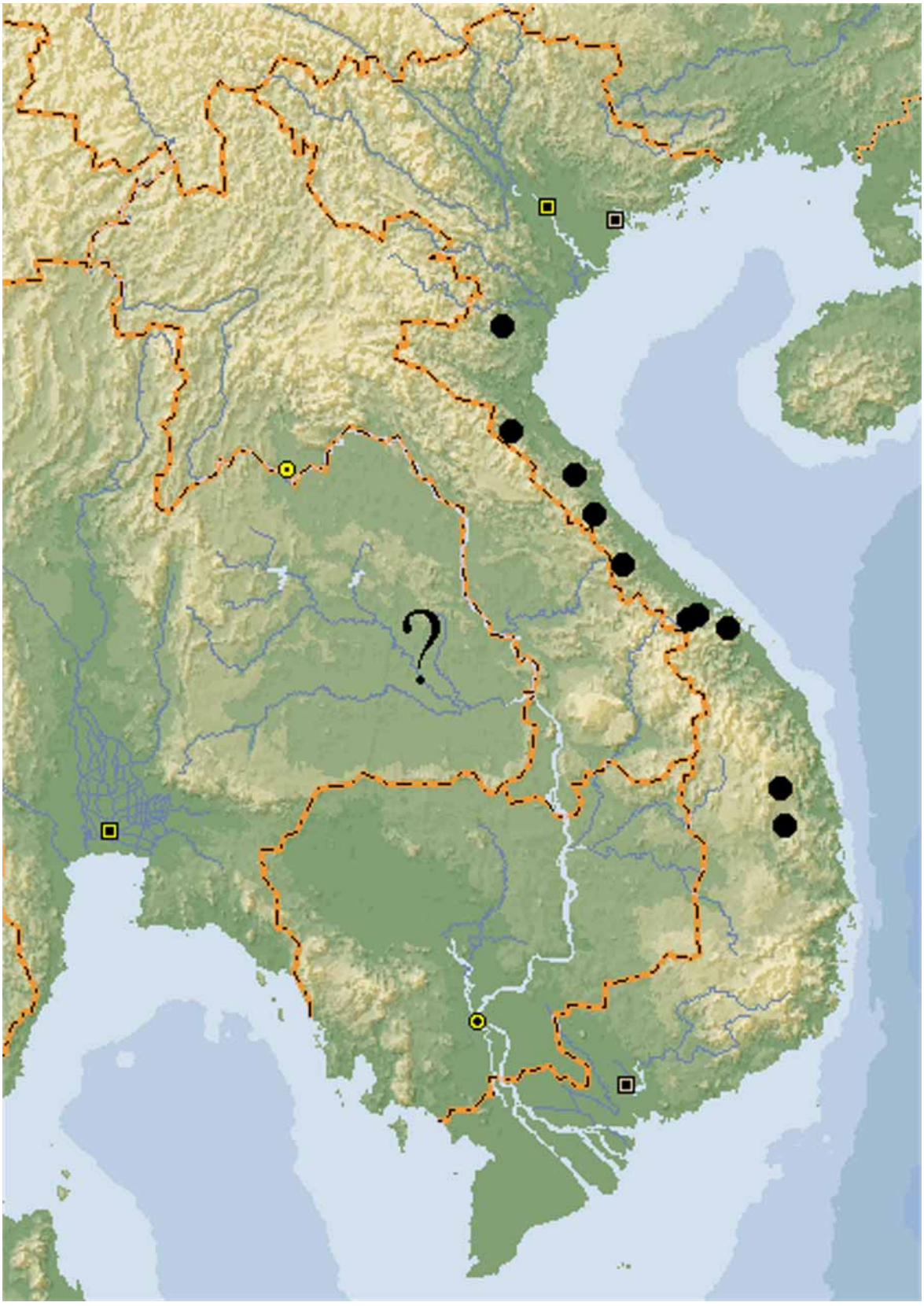

FIGURE 12. Distribution of *Amphiesma leucomystax* **spec. nov.**

Most specimens were associated with forest streams on slopes of the hills or mountains, but specimens AMNH 154175 and IEBR 2314 were collected in lowlands. Most snakes were collected at night, either during the rainy or the dry season. All of them were in or next to water, either coiled on leaves or stones, or, for specimens ZFMK 71703-704, perched on branches above the stream. Specimen ZFMK 71703 was coiled and digesting at 2.5 meters above the ground. To the best our knowledge, this is the first record of arboreality in the genus *Amphiesma*.

Specimen ZFMK 71703 had in its stomach a large female of *Leptobrachium chapaense* (Field number TZ '98/121, see Ziegler 2002: 45) swallowed hindlegs first, with partly digested hindlegs.

Specimen ZFMK 71704 contained 4 large eggs, up to 25 x 7 mm. Other gravid females (ZISP 23670, 23671-23672) were collected in April-May. They contained 3, 5 and 7 eggs respectively in the lower part of oviducts. Juvenile specimens were found on 15th October (SVL 163 mm) and 20th April (SVL 205 mm).

Discussion

Morphological comparisons with other species

Amphiesma leucomystax **spec. nov.** can be differentiated from all other species of the genus *Amphiesma* by the combination of (1) a distinctive broad, white band on the side of the head, (2) transversally elliptical or divided dorsolateral spots, (3) the two first DSR being entirely smooth. The broad head stripe differentiates *Amphiesma leucomystax* **spec. nov.** from all other natricine species of the Indochinese Region.

Amphiesma leucomystax **spec. nov.** is further distinguished from *Amphiesma atemporale, A. sauteri* (including the taxa *A. s. bourreti* and *A. s. maximus*) and *A. venningi* by having 19 DSR vs. 17 rows in the other species. Furthermore, *Amphiesma venningi* has strongly keeled dorsal scales in the region of the vent and on the tail, a dark venter (cream in *A. leucomystax* **spec. nov.**) and a distinct dorsal pattern composed of large elongate blotches (faint dorsolateral stripes marked by a series of spots in *A. leucomystax* **spec. nov.**). *Amphiesma atemporale* lacks temporal scales (present in *A. leucomystax* **spec. nov.**).

Amphiesma stolatum and *Amphiesma bitaeniatum* possess distinct, continuous dorsolateral stripes (faint dorsolateral stripes, marked by a series of spots in *A. leucomystax* **spec. nov.**). A description of *A. bitaeniatum* can be found in David *et al.* (2005). *Amphiesma optatum* and *A. andreae* possess dorsal transversal, narrow or wide crossbars, and have no longitudinal dorsolateral stripes or series of dots.

Among the remaining species with 19 DSR, *A. leucomystax* **spec. nov.** further differs from *A. modestum* and *A. deschauenseei* by (1) having lateral nostrils vs. rather dorsolateral in the two latter species; (2) the lack of distinct postocular streaks in *A. modestum* and *A. deschauenseei*; and (3) a lower number of subcaudals in females, 94–103 vs. 104–128 in *A. modestum* - *A. deschauenseei*.

A. leucomystax **spec. nov.** further differs from *A. xenura* by its divided subcaudals.

Among the other Indochinese species, *A. sauteri* differs by its lower number of DSR (17 vs. 19). *A. leucomystax* **spec. nov.** differs from *A. popei* by a higher number of ventrals (*A. leucomystax* **spec. nov.** 154–166, *A. popei* 131–142) and a different dorsal pattern (light crossbars on dorsolateral stripes and a large white nuchal blotch in *A. popei* vs. faint dorsolateral stripes marked by a series of spots and a V-like chevron in *A. leucomystax* **spec. nov.**).

Amphiesma leucomystax **spec. nov.** further differs from *A. khasiense* and *A. inas* with its all white supralabials (composed of distinct, rounded blotches in *A. khasiense* and *A. inas*, at least on the posterior supralabials), higher number of ventrals (*A. leucomystax* **spec. nov.** 154–166, *A. khasiense* and *A. inas* 141–153), smooth first DSR (often distinctly keeled in *A. inas* and *A. khasiense*), and narrowed internasals in *A. leucomystax* **spec. nov.** (truncated in *A. khasiense* and *A. inas*). *Amphiesma leucomystax* **spec. nov.** is further differentiated from *A. johannis* by the number of supralabials (9–10 in *A. leucomystax* **spec. nov.**, 7–8 in *A. johannis*), a lower number of ventrals (*A. leucomystax* **spec. nov.** 154–166; *A. johannis* 165–175) and a higher

number of subcaudals (*A. leucomystax* **spec. nov.** 94–103; *A. johannis* 76–89) (Zhao *et al.*, 1998). *Amphiesma leucomystax* **spec. nov.** further differs from *A. craspedogaster* by the number of anterior temporals (*A. leucomystax* **spec. nov.** 1; *A. craspedogaster* usually 2 or 3), and a higher number of subcaudal scales (*A. leucomystax* **spec. nov.** 94–103; *A. craspedogaster* 78–96) (Pope, 1935; Zhao *et al.*, 1998).

Although *Amphiesma boulengeri* also possesses a distinct white streak on the side of the head and neck, it is much narrower and starts from the posterior lower margin of the eye, extends on posterior supralabials up to the nape, without forming a strong chevron. *Amphiesma leucomystax* **spec. nov.** further differs from *A. boulengeri* by the absence of dorsolateral stripes (present as distinct dorsolateral stripes in *A. boulengeri* or as stripes marked with irregular spots); a higher number of ventral scales (*A. leucomystax* **spec. nov.** 154–166; *A. boulengeri* 139–156 [our data]); a smaller ratio length 4 caudal scale rows / length 6 caudal scale rows (0.75–1.03 [x = 0.82; s = 0.11] in female *A. leucomystax* **spec. nov.**; 1.03–1.92 [x = 1.41; s = 0.27] in *A. boulengeri*); and a different ventral pattern (square blotches next to darkened tips of ventrals in *A. boulengeri*, small, more or less faint and large greyish-brown blotches, never well defined in *A. leucomystax* **spec. nov.**). It should be noted that we are treating here *A. boulengeri* as a wide ranging species, present in South China, Vietnam, Laos, Cambodia and eastern Thailand. On-going studies may show the presence of more than one species under this name; nevertheless, the range of characters given above to distinguish *A. boulengeri* from *A. leucomystax* **spec. nov.** will remain valid.

Key to the species of the Indochinese Region

This key was constructed from Bourret (1936), Smith (1943), Taylor (1965), Ziegler & Le (2006), as well as our unpublished data. Species not known from Vietnam and adjacent areas are placed in brackets.

1 17 scale rows at midbody 2
- 19 scale rows at midbody 5
2 Anal single; Peninsular Thailand only ..... (*Amphiesma groundwateri*)
- Anal divided 3
3 Nostrils dorsolateral; dorsal scales of tail strongly keeled; supralabials largely dark; dorsum dark with large dorsolateral orange blotches anteriorly, followed by elongated streaks ..... (*Amphiesma venningi*)
- Nostrils lateral; dorsal scales of tail keeled as body; supralabials largely light, with darker edges; dark dorsum with stripes or small dorsolateral spots 4
4 No temporal; 5–6 SL ..... *Amphiesma atemporale*
- At least 1 anterior temporal; 7–8 (rarely 6) SL ..... *Amphiesma sauteri*
5 Dorsal pattern with two or more distinct, black-edged dorsolateral stripes on a background color grey, ochre, tan, pale brown or beige 6
- Dorsal pattern without distinct stripes, with bands, with dorsolateral spots, or at most two faint beige or brown stripes on dark brown or grey brown 10
6 Head and neck orange or rusty brown; no postocular streak; numerous large, black dorsal blotches on the nape and above and below the dorsolateral stripes; internasal distinctly narrowed anteriorly; less than 160 VEN; last two maxillary teeth distinctly and abruptly enlarged ..... *Amphiesma stolatum*
- Head more or less colored as body; a distinct postocular streak; no black blotches on body; internasals truncated anteriorly; usually more than 160 VEN; last two or three maxillary teeth moderately, not abruptly enlarged 7
7 Enlarged posterior maxillary teeth separated from others by a distinct diastema; flanks and upper dorsal surface of same tone (neither paler nor lighter); black postocular streak separated from lower body lateral

black stripe by a gap, or barely in contact; a black preocular streak on preocular and loreal .... *Amphiesma parallelum*

- Enlarged maxillary teeth not separated from others by a diastema; flanks distinctly paler or distinctly darker than upper dorsal surface; dark postocular streak in continuity with lower body lateral black stripe; no black preocular streak on preocular and loreal 8

8 Dorsal color brown or ochre-brown; stripe bordered with two narrow black lines; flanks paler than upper body, speckled with black but not marked with a low lateral black stripe; dorsal scales strongly keeled and deeply notched posteriorly..... *Amphiesma bitaeniatum*

- Dorsal color grey or brownish-grey; stripe bordered below with one or two wide dark grey or dark brownish-grey stripes, making the flanks distinctly darker than upper body; dorsal scales smooth or weakly keeled, not or very slightly notched 9

9 Dorsal color usually light grey or brownish-grey; dorsolateral stripe ending anteriorly in narrowing on the nape; stripe bordered with two dark stripes, the lower one, irregular, very wide; a narrow pale zig-zag-like line on upper part of 1st DSR ..... *Amphiesma octolineatum*

- Dorsal color grey or blackish-brown; dorsolateral stripe ending anteriorly in widening on the nape; dark brown or dark brownish-grey on the sides; no zig-zag line on upper part of SR 1 .....(*Amphiesma metusia*)

10 Dorsal pattern with vertical crossbars or incomplete bands 11

- Dorsum not banded, but ornate with dorsolateral dots or stripes 12

11 Narrow pale crossbars on a deep bluish-black background color; no pale spots on head; 152–169 VEN; 7–8 SL..... *Amphiesma optatum*

- Wide pale crossbands anteriorly, body not bluish-black; numerous round spots on head; 179 VEN in the sole known male; 9 SL ..... *Amphiesma andreae*

12 Nostrils dorsolateral; internasals narrowed anteriorly; supralabials largely dark; no distinct postocular streak; two dorsolateral stripes 13

- Nostrils lateral; internasals truncated; supralabials largely light; usually a postocular streak, continuous or divided into spots; dorsolateral spots on a faint stripe or on the background color 14

13 Venter pale with blotches on ventral tips; ratio TaL/ TL: 0.29–0.33; 104–117 SC; dorsal scales weakly keeled or smooth..... (*Amphiesma modestum*)

- Venter largely obscured, at least posteriorly; ratio TaL/ TL: 0.33–0.38; 111–141 SC; dorsal scales distinctly keeled..... *Amphiesma deschauenseei*

14 Subcaudals single..... (*Amphiesma xenura*)

- Subcaudals paired 15

15 A broad, white stripe from the snout tip to the corner of the mouth, extending on the nape and forming a conspicuous chevron ..... *Amphiesma leucomystax* spec. nov.

- Head pattern not as above..... 16

16 One white vertical streak before and another vertical white stripe just behind the eye; usually 4 PosOc; more than 115 subcaudals..... *Amphiesmoides ornaticeps*

- Head pattern not as above; 2 or 3 PosOc; less than 115 subcaudals..... 17

17 Posterior supralabials each marked with a distinct, round or oval central cream colored blotch; 1st DSR keeled..... *Amphiesma khasiense*

- Posterior supralabials diffusely edged with black or with an elongated cream colored blotch going on the neck; 1st DSR smooth..... 18

18 Supralabials all white or cream, diffusely edged with black 19

- Anterior supralabials white, posterior black with a median elongated cream colored blotch or streak, forming a postocular stripe extending on the neck..... *Amphiesma boulengeri*

19 Dorsal pattern variegated or reticulated with darker and lighter diffuse blotches; dorsal scales smooth or weakly keeled .....*Amphiesma johannis*

- Dorsal pattern not as above, with dorsolateral stripes; dorsal scales distinctly keeled 20

20 130–142 VEN; 1st DSR smooth; a broad pale blotch on the nape, not touching the latest supralabial ....*Amphiesma popei*

- 145–172 VEN (*);1st DSR keeled; a yellow streak on the nape starting from the latest SL; dorsal scales distinctly keeled.....*Amphiesma craspedogaster*

(*): Zhao *et al.* (1998: 58–59) mentioned a specimen from the Chinese Fujian Province with only 132 VEN, a value that seems to be anomalous.

Conclusion

A revision of the genus *Amphiesma* at the species level is badly needed. Currently, revisions of the groups of *Amphiesma parallelum* and of *Amphiesma khasiense* / *modestum* are in progress. A phylogeny of the whole genus is also badly needed, but in absence of one (particularly using molecular data), it is difficult to ascertain the relationships of *Amphiesma leucomystax* **spec. nov.** From morphological data, including scalation and pattern, we refer *A. leucomystax* **spec. nov.** to the artificial *Amphiesma khasiense*-group, which contains *A. khasiense*, *A. inas*, *A. boulengeri*, and *A. johannis*. By its habitus, scalation and pattern, *A. leucomystax* **spec. nov.** shares most characters with *Amphiesma boulengeri*, but phylogenetic analyses will be necessary to conclude on its relationships.

The description of *Amphiesma leucomystax* **spec. nov.** raises to 41 the number of species currently recognized within this genus. A list was given in David & Das (2003), to which should be added *Amphiesma andreae* Ziegler & Le, 2006 and now *Amphiesma leucomystax* **spec. nov.**

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Appendix. List of examined specimens

Amphiesma atemporale (*n* = 7). **Vietnam**. Vinh Phu Province. MNHN 1935.0077-78, MNHN 1935.0450, MNHN 1938.0120, MNHN 1958.0461-62, "Tam Dao", now Tam Dao Hill Station. - No locality. MNHN 1938.0119, "Indochine", no precise locality.

Amphiesma bitaeniatum (*n* = 14). **Myanmar**. AMNH 48468, "Huton, Kachin Hills, Burma", now in Kachin State; BMNH 1925.9.17.3, BMNH 1925.12.22.19, "Huton, Kachin Hills, Burma", now in Kachin State; BMNH 1946.1.13.58, "Kutkai, North Shan States, Burma: 6000 feet", now Kutkai, Shan State. - **People's Republic of China**. Yunnan Province. BMNH 1946.1.13.56, "Hotha, Valley, Yunnan", now Husa, Longchuan Xian; BMNH 1946.1.21.87, "Sanda, Upper Irrawady", now Lianghe County; CAS 215037, Nu Jiang Nature Reserve near Pianma, on western slope of Gaoligongshan (26°00'03.2N–98°39'41.6E), ca 7800 ft, Nu Jiang Xian; SMNH 1259,

Yunnan; ZMB 28951, no precise locality. Guangxi Zhuang Autonomous Province. 1 specimen, M.W. LAU'S collection (no number), Cenwanglao Shan. - **Thailand**. NRCT 980506, Doi Inthanon, Chiang Mai Province. - **Vietnam.** Bình Thuân Province. BMNH 1930.11.16.5, "Fan-Si-Pan, Lao Kay, Tongking", now Mt. Phang Si Pang. - Lào Cai Province. MNHN 1999.9090, vicinity of Sapa; ROM 38098, Lao Cai.

***Amphiesma boulengeri*-group** (*n* = 65). **People's Republic of China**. Jiangxi Province. MVZ 23622, "Hong San, SE Kiangsi; elevation 850 m". - Guangdong Province. MVZ 23623, "Tai-Yong, E Kwantung Prov.; elevation 540 m", now Dayang, Jiexi County; ZMB 27694, "N. Kuangtung, China", North Guangdong; SMNH 1238, no locality. - Guangxi Zhuang Autonomous Province. CIB 602339, Pinglin, Yao Shan; 1 specimen, M.W. LAU'S collection (no number), 9.VII.1999, Diging. - Guizhou Province. CIB 63II5098, Leishan. - Yunnan Province. CIB 584172-73, Pingbian. - Hainan Province. CIB 745084. - **Vietnam**. Vinh Phu Province. MNHN 1935.0061-0063, MNHN 1935.0451-0453, MNHN 1958.0459-0460, "Tam Dao, Tonkin", now Tam Dao Hill Station; MNHN 1997.3307, MNHN 1999.9093-9094, Tam Dao; MVZ 224141-143, MVZ 224145-148, MVZ 224153, MVZ 226513, MVZ 226515, Tam Dao, Vinh Yen District; elev. 900 m. - Lao Cai Province. MNHN 1935.0064, "Chapa, Tonkin", now Sapa. - Gia Lai Province. FMNH 252117, FMNH 252120-123, Ankhe District. - Lam Dong Province. BMNH 1921.4.1.3-5, Langbian Plateau; BMNH 1969.1716-18, "Lang Bian", Lang Bian Plateau. - No locality. CAS 73737, "Southern Annam"; FMNH 71709, No locality; FMNH 178399, "French Indochina". - **Laos**. Xiengkhuang Province. MNHN 1928.0056-0057, "Xieng-Khouang". - **Cambodia**. Kampong Speu Province. LSUHC 07442-44, LSUHC 07464-65, LSUHC 07484, Camp 2, Phnom Aral, Cardamom Mts., 1100 m. - Kampot Province. BMNH 1928.6.29.9, "Bokor, Kamchay Mts.", now Bokor Hill Station, Chuor Phnom Damrei (Elephant Mountains); BMNH 1969.1710-15, BMNH 1969.1720, "Bokor Plateau, Elephant Mts.", now Bokor Mt., Chuor Phnom Damrei (Elephant Mountains). - **Thailand**. Nakhon Ratchasima Province. FMNH 180153-154, Khao Yai. - Nakon Si Thammarat Province. BMNH 1916.3.27.31, "Nakon Si Tamarat".

Amphiesma craspedogaster (*n* = 11). **People's Republic of China**. Fujian Province. BMNH 1910.9.6.2, "South Fokien"; BMNH 1946.1.12.63–65, "Kuatun, N.W. Fokien", now Guadun, Wuyi Shan, Chongan County; SMNH 2757, SMNH 3592-3594, Congan Shangang. - Guizhou Province. MNHN 1912.0324-26, no locality.

Amphiesma deschauenseei (*n* = 23). **Thailand**. Chiang Rai Province. BMNH 1969.1719, Doi Chang. - Chiang Mai Province. CUB MZ (R) 5; Forestry Station, Doi Suthep, 3,000 ft; CUB MZ (R) 36118; Doi Suthep; FMNH 178396-98, Chiang Mai; BMNH 1969.1721-1725, BMNH 1974.5193, "Pa Meang, Me Nga", now in the vicinity of Pa Muang (or Pamuang). - No precise locality. BMNH 1921.4.1.6-9, "Hills of North Siam"; CUB MZ (R) 1999.63, "Thailand". - **People's Republic of China**. Yunnan Province. CIB 81II0366, Baoshan; CIB-R579003, no locality. - Guizhou Province. CIB63III6122, CIB63III6129, Luodian. - **Vietnam**. Cao Bang Province. ROM 28638. - Tuyen Quang Province. IEBR 2295, forest near Ban Cai Village, Duc Xuan Commune, Na Hang District, ca. 300 m asl.

Amphiesma inas (*n* = 7). **Federation of Malaysia**. **West Malaysia**. State of Pahang. MNHN 1999.9092, ZRC 2.4055-4058, Cameron Highlands; BMNH 1938.8.7.13-14, Bukit Fraser (or Fraser's Hills).

Amphiesma johannis (*n* = 2). **People's Republic of China**. MNHN 1912.0272-73, "Chine occidentale et Marches thibétaines".

Amphiesma khasiense (*n* = 29). **India**. State of Arunachal Pradesh. BBB P377-379, Dihang Dibang Biosphere Reserve, Dibang Valley. - State of Meghalaya. BMNH 1946.1.12.80-82, BMNH 1946.1.13.45, "Khasi Hills". State of Nagaland. KSC 140, Kohima, 1000-1500 m. - **Myanmar**. Chin State. CAS 220023, Min Dat District, Min Dat Township, Nat Ma Taung National Park, 21°22'20.1"N–93°58'34.6"E. - Kachin State. BMNH 1925.4.2.10-15, BMNH 1925.4.2.15A, "Huton, Bhamo District, Upper Burma"; BMNH 1946.1.13.62-63, "Huton, Bhamo District"; BMNH 1974.884, Naung Hkai, 27°15'N–97°45'E, 1200 ft.; CAS 224654, Nagmung Township, Nagmung Town, Putao District, 27°30'18.8"N–97°48'33.9"E; CAS 224694, Nagmung Township: Nagmung Town, Putao District, 27°29'49.6"N–97°49'06.9"E, 1820 ft. - Kayah State. MNHN 1893.0399, "Mts Carin, 900–1000 m", now Mts. Karen. - **People's Republic of China**. Yunnan Province. CIB 2000I0009, Ruili. - Guangxi Zhuang Autonomous Province. CIB-Xi0089, no locality. - **Laos**. Phongsaly Province. MNHN 2004.0248, Long Nai. - **Thailand**. Chiang Mai Province. NRCT 980504, Doi Inthanon. - Loei Province. QSMI 273, Phu Luang, Research Station Area. - No locality. FMNH 251780-81, no precise locality.

Amphiesma metusia (*n* = 10). **People's Republic of China**. Sichuan Province. BMNH 1911.12.19.1, "Szechuan"; CAS 195196-195197, vicinity of elev. 2400 m, 9.5 km north of Tuowu (28°49'N – 102°17'E), on the Hanyuan to Xichang Road, then 1.4 km NNE of dirt road, Liangshan Yizu Autonomous Prefecture; FMNH 18722, "Hsiao Yang Chi", Sichuan; FMNH 170647, "Sikang", now eastern Sichuan; FMNH 232805, 9 km west of Bin Ling, Wa Shan Camp, Hongya Xian; FMNH 232806, Hongya Xian; USNM 69926-69927, near Washan; ZMB 27866, Washan.

Amphiesma modestum (*n* = 9). **India**. Meghalaya. BMNH 76.2.16.1-2, "Cherra Punji, Khasi Hills", now Cherrapunji; BMNH 1946.1.13.40-41, Khasi Hills. - **Myanmar**. Kachin State. BMNH 1925.4.2.16, "Hutong, Bhamo District"; BMNH 1925.9.17.2, BMNH 1925.12.22.22-23, "Huton, Kachin Hills". Kayah State. MNHN 1893.0400, "Mts Carin, 1200–1300 m", now Mts. Karen.

Amphiesma octolineatum (*n* = 34). **People's Republic of China**. Yunnan Province. AMNH 21022, AMNH 21024, "Lichiang-fu, 8500 ft", now Lijiang Naxizu Zizhixian; AMNH 21050, AMNH 21051, "Yunnan: Tengyueh", now

Tengchong County; AMNH 35210, “Yunnan: Hsin Kai”, Yunnan Province; AMNH 66653, “Yunnan: Kunming”; BMNH 1904.11.29.16-20, “Ku-taing Fu”, now Gudong; BMNH 1905.1.30.62, “Tongchuan-fu, Yunnan”, now Dongchuan County; BMNH 1905.5.30.16-20, BMNH 1946.1.12.60, BMNH 1946.1.13.46, BMNH 1946.1.13.57, “Yunnan Fou”, now Kunming; CAS 64272, “Yunnan”; ZMB 65438-441, ZMB 65571, ZMB 65576, ZMB 65579, ZMB 65582-584, “Talifu W-Yunnan”, now Dali County. - Guizhou Province. SMNH 2527, Yin River, Fanjing Shan, Hengyuanzi, 1800 m. No precise locality. MNHN 1905.289, MNHN 1907.12, “Chine”.

***Amphiesma parallelum*-group** (*n* = 15): **India**. West Bengal. BMNH 60.3.19.1359, “Himalaya”; BMNH 80.11.10.153, “Darjeeling”; BMNH 1923.10.13.38, “Darjeeling District”; BMNH 1946.1.13.53, “Sikkim”. Meghalaya. BMNH 1946.1.12.83-84, BMNH 1946.1.13.48, “Khasi Hills”; ZSI/ERS 3077, Risa Colony, Shillong; ZSI/ERS 9059, Tripura Castle Road, Shillong; ZSI/ERS 9060, Selbelgiri, Garo Hills; ZSI/ERS 9070, a stream near Fruit Garden, Shillong. Nagaland. KSC 414, Sechu, 1000 m. - **Myanmar**. Kachin State. BMNH 1940.6.4.29, “Pangnam-dim, The Triangle, Upper Burma”, a village about 24 km northeast of Watamkawng (27°43°N–97°52'E). - **Nepal**. BMNH 58.6.24.5, “Nepal” (?). - **People’s Republic of China**. Yunnan Province. CAS 215036, Nu Jiang Nature Reserve, near Pianma (26°00'10.3 N – 98°39'31.7 E), Nu Jiang Xian.

Amphiesma popei (*n* = 2). **People’s Republic of China**. Guangxi Zhuang Autonomous Province. 1 specimen, M.W. LAU’S collection (no number), 4.VIII.1999, Dawangling. - **Vietnam**. Vinh Phu Province. ZISP N-155, Tam Dao.

Amphiesma sauteri (*n* = 8). **People’s Republic of China**. Guizhou Province. MNHN 1912.0327-28, “Kouy-Tchéou”, no locality. - Hainan Province. 1 specimen, M.W. LAU’S collection (no number), 27.V.1999, Diaoluo Shan. - **Vietnam**. Vinh Phu Province. MNHN 1908.0011, MNHN 1935.0066-67, MNHN 1935.0454-55, “Tam Dao, Tonkin”, now Tam Dao Hill Station.

Amphiesma venningi (*n* = 6). **Myanmar**. Chin State. BMNH 1910.12.9.1, BMNH 1946.1.13.49, BMNH 1946.1.21.86, “Haka, Chin Hills”, now Haka, 22°38'60N–93°37'0E. - Kachin State. BMNH 1925.9.17.6, BMNH 1925.12.22.21, “Huton, Kachin Hills, Burma”, now in Kachin State; BMNH 1946.1.13.60, “Bhamo District, Huton, Upper Burma”.

Amphiesma xenura (*n* = 1). **Myanmar**. Rakhine State. CAS 220550, Daung stream, Gwa Township, 17°35.051N–94°40.689E.